



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Requirements Engineering and Management

June 14, 2012

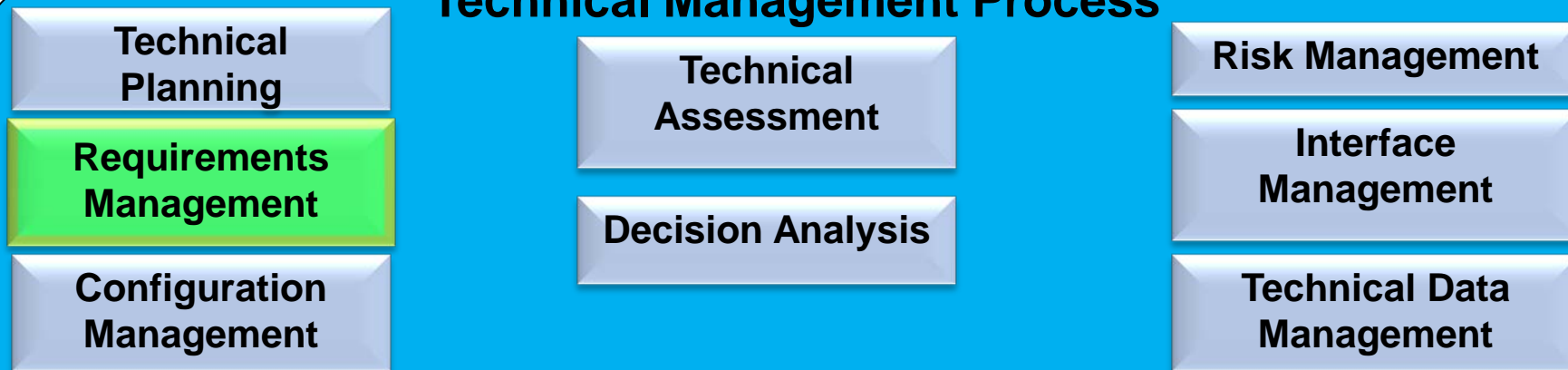
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14. ABSTRACT A collection of activities undertaken by many people on a project in order to gather, document, store, analyze, track, and implement requirements, while controlling change and communicating with stakeholders.					
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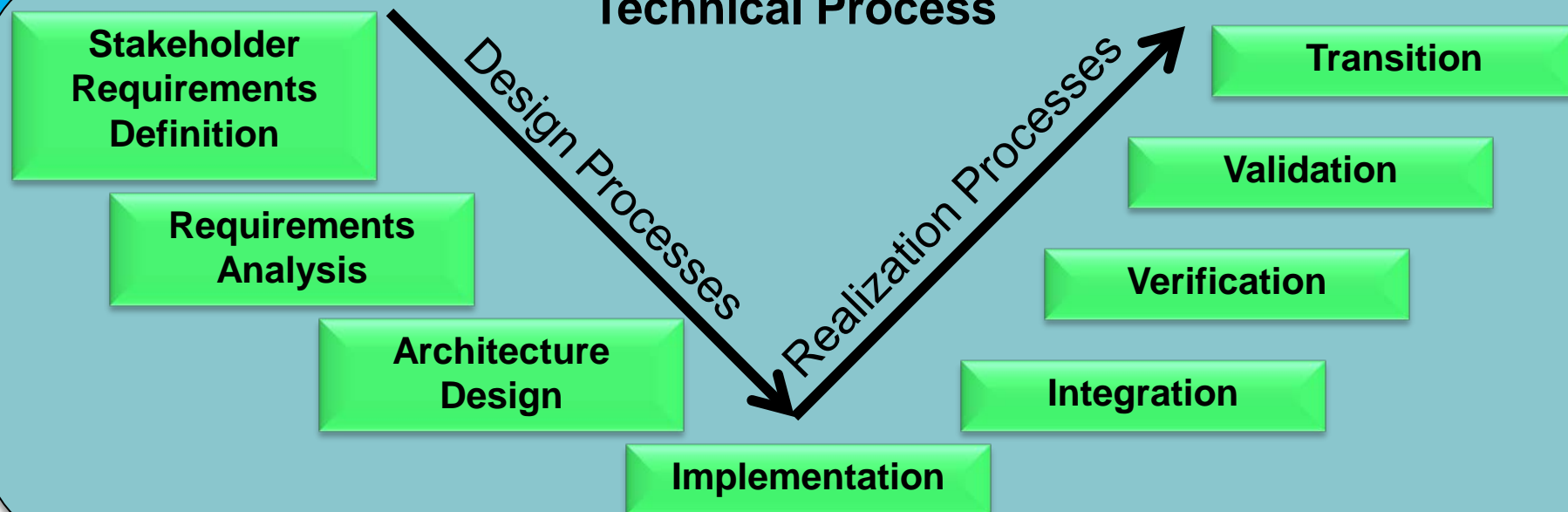
- **What is Requirements Engineering and Management?**
 - A collection of activities undertaken by many people on a project in order to gather, document, store, analyze, track, and implement requirements, while controlling change and communicating with stakeholders.
- **Why do we need Requirements Engineering and Management?**
 - People involved on the project are:
 - Continually kept apprised of requirement status
 - Understand the impact of changing requirements specifically, to schedules, functionality, and costs.

- Ensures that the voice of the customer is heard throughout the entire development process
- Not restricted to a single phase in the lifecycle
- Key task is traceability of the requirements
- Different techniques, approaches and tools may be used
- Success depends on the commitment of the whole project team

Technical Management Process



Technical Process



Requirements Define:

- What the users want to achieve.
- What the system must do to satisfy user needs.
- What each component must do, and how components will interact.

Requirements:

- Have only one "shall" statement
- Have only one action verb
- Do not have stacked (multiple) "shall" statements in a list

- **Unambiguous** - The reader of a requirement statement should be able to draw only one interpretation of it.
- **Verifiable** – There is a value or test to measure the requirement against to insure the intent of the requirement is being met. The verification methods can be an inspection, demonstration, analysis, or a test to determine whether each requirement is properly implemented in the product.
- **Traceable** - You should be able to link each requirement to its source, which could be a higher-level system requirement, a use case, or a voice-of-the-customer statement

- **Correct** - Must accurately describe the functionality to be delivered.
- **Feasible** - Must be possible to implement each requirement within the known capabilities and limitations of the system and its environment.
- **Necessary** - Should document something the customers really need or something that is required for conformance to an external requirement, an external interface, or a standard.

- **DOORS (Dynamic Object-Oriented Requirements System)**
 - Made for Requirements Engineering and Management
 - Traceability (requirement, derived requirements, decisions, test reports, etc.)
 - Allocations
 - History/Change Management
 - Baselining
 - Access Control
 - Single Access Point for Requirements
 - Able to Export/Import Information into Other Formats

**LCMC managers –
indirect consumers of
DOORS data**

**Direct consumers of
DOORS data**

**Data owners and
authors**

**Power users, administrators,
project jump-start teams**

Leveraging DOORS
2 hour - concepts only

Intro to DOORS
2 hour hands-on + homework

DOORS Basic User Training
2 hour hands-on + homework

Traceability Links
2 hour hands-on + homework

Importing Information into DOORS
4 hour hands-on + homework

Managing DOORS Projects
4 hour hands-on + homework

Decision Management in DOORS
4 hour hands-on + homework

DOORS Extension Language (DXL)
4 hour hands-on + homework

DOORS training is available through TARDEC SEG. Contact any SEG group member for more information.



Benefits of Requirements Engineering and Management using DOORS



❖ **Traceability From Highest Level Requirements To Implementations**

- ☐ Established Via Links In DOORS Database
- ☐ Building Traceability Improves The Quality Of Requirement Analysis, Ultimately Producing Better Work Products

❖ **Impact Assessments Of Proposed Changes**

- ☐ DOORS Analysis Tools Let You See Which Other Requirements Will Be Affected By A Change

❖ **Controlled Access To Project Information**

- ☐ A Shared Database Ensures That All Users Are Working With Current Data
- ☐ A Central Repository Allows Controlled Access To Essential Information

❖ **Change Control**

- ☐ DOORS Complements Configuration Management

Ground Systems Integration Domain (GSID)

1. Support Systems Engineering Analysis
2. Align Capability, Platform and Technology Roadmaps
3. Inform S&T Portfolio Decisions

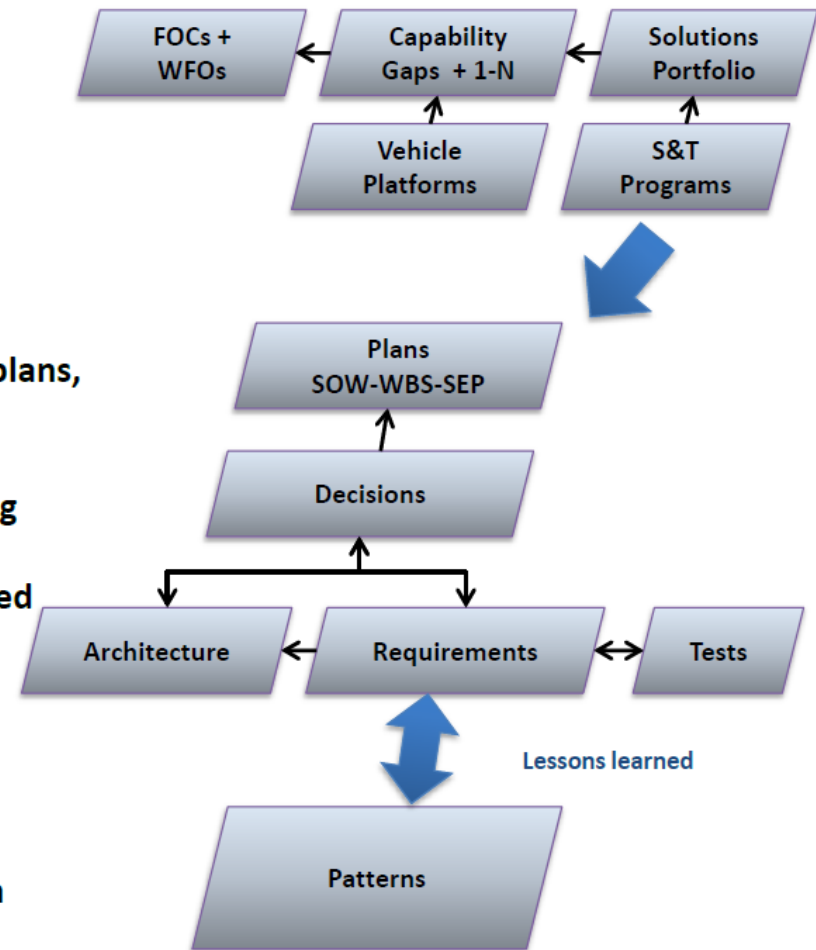
S&T and ACAT Programs

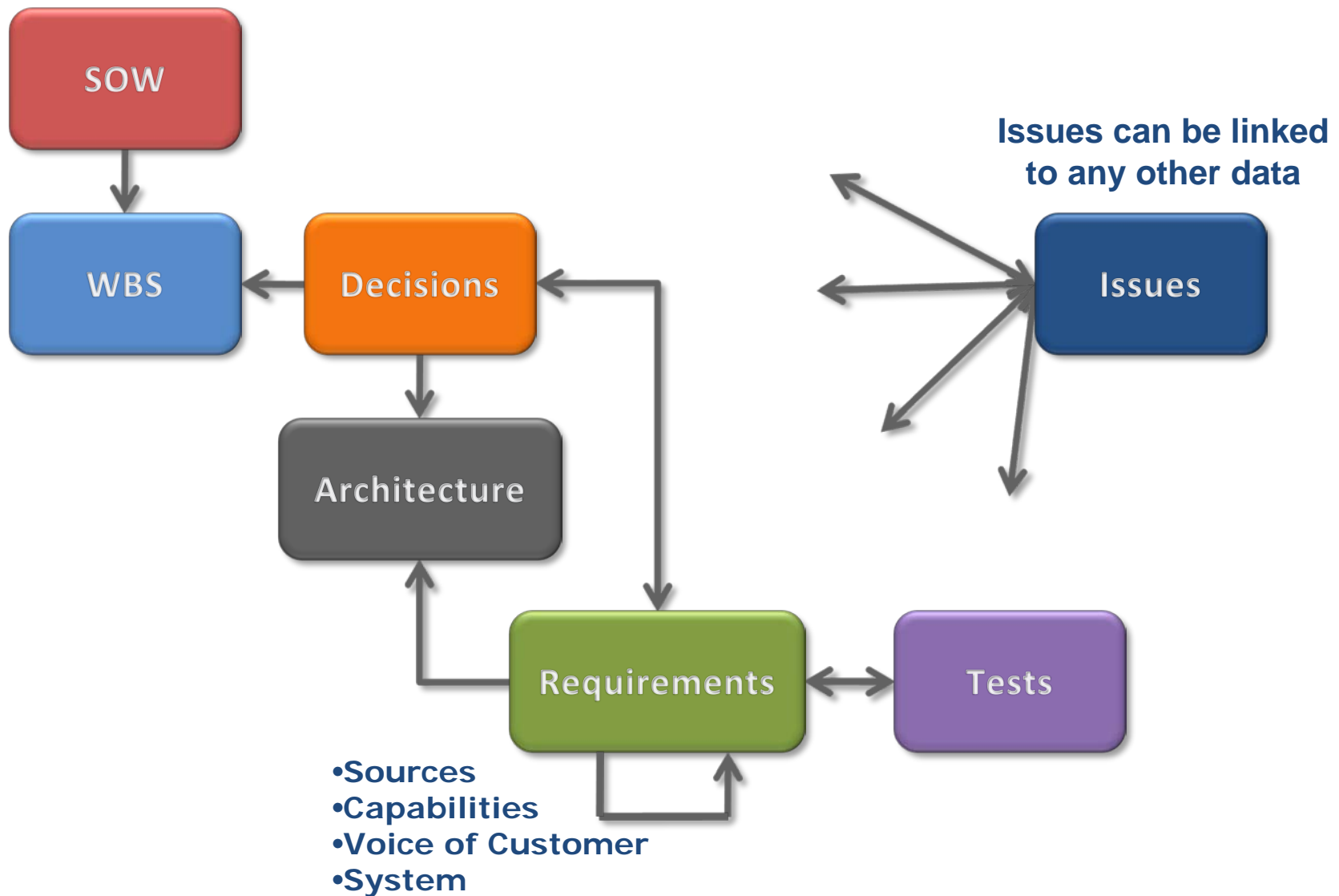
1. Maintain continuous traceability between plans, decisions, requirements, designs and tests
2. Frame and inform decisions (trade studies)
3. Guide modeling, simulation and prototyping
4. Manage baselines
5. Adapt quickly to changes and lessons learned

Knowledge Reuse

1. Develop and refine patterns and templates (decisions, requirements, plans)
2. Jump-start programs; accelerate solutions
3. Identify opportunities for common solution

A lot more than just requirements





Questions traceability can answer

SOW What is our scope & charter?	How will we accomplish our charter? Is our plan adequate?			N-Squared Diagram Legend <table><tr><td>Node A</td><td>A-to-B interaction</td></tr><tr><td>B-to-A interaction</td><td>Node B</td></tr></table> <i>Read the interactions clockwise</i>		Node A	A-to-B interaction	B-to-A interaction	Node B
Node A	A-to-B interaction								
B-to-A interaction	Node B								
How will work flow down to others?	WBS What's our plan? Who's responsible? Is plan adequate?								
	How will we analyze or implement this decision?	DECISIONS Top N decisions? Status? Rationale? Consequences?	Why does this component exist? What role does it play?	Where did this requirement originate? Change impact?					
			ARCHITECTURE Components in our solution? Interfaces?						
		What decisions did this req't drive? Budget allocation? Change impact?	Allocated requirements? Budget flow-down?	REQUIREMENTS Success = ? Clear? Complete? Source?	Requirements per test? Verification coverage?				
				Requirements met? Priority gaps to fix?	TESTS Test events/cases? Test enablers? Results/findings?				